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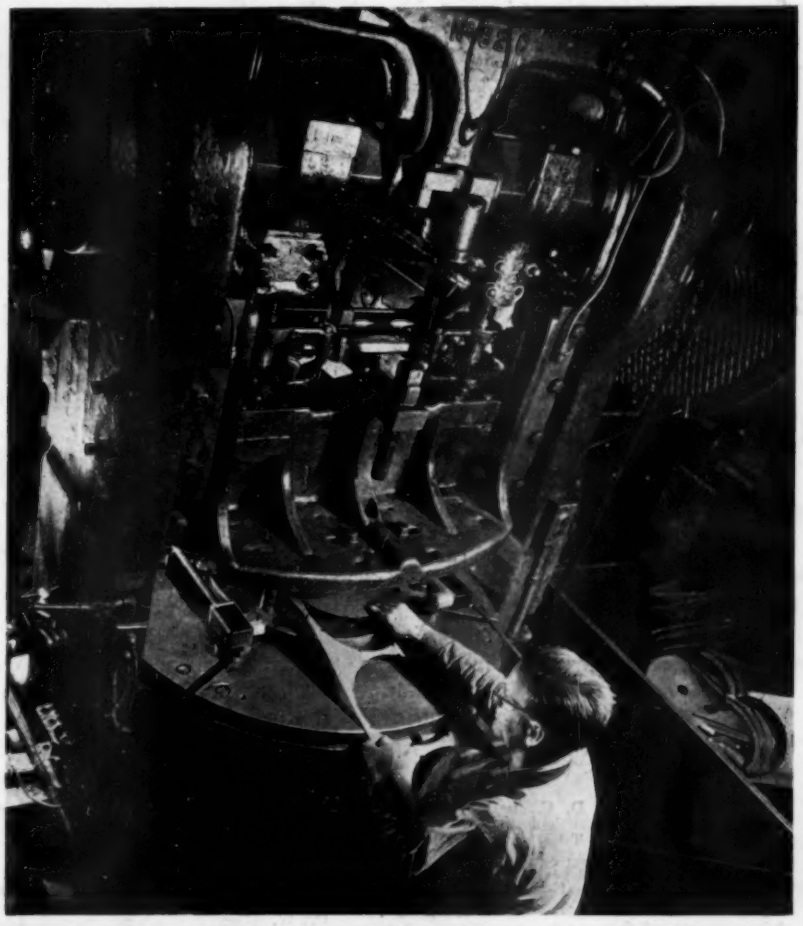
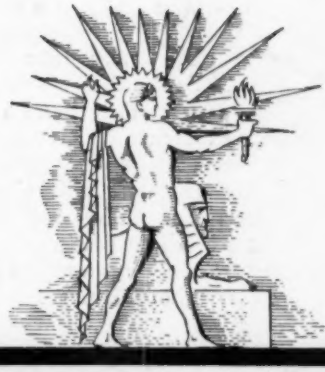
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •





November 30, 1940

"Safety Engineer"

See Page 344

A SCIENCE SERVICE PUBLICATION

Do You Know?

A pigeon's *bones* weigh less than its feathers.

A series of 27 tests will be given to 2,500 New York school children, to find out how well *nourished* they are.

There are still at large in foreign countries 20,000 kinds of *insect pests* which have not got into the United States.

One of the largest *target* fields in the United States for use of Army fliers will be made from 1,500,000 acres of federally owned range land in Utah.

Latest reports from China say that *student* enrollment in the 13 Christian colleges has increased by almost 1,200, in the fourth year of China's war.

In the United States' 3,000,000-mile highway system, 75,000 miles are designed as *strategic highways* linking important industrial and military points.

A *skunk* is employed by the New York State Conservation Department at the congenial job of digging up white grubs (its favorite food) in a forestry nursery.

In tribal wars, natives of New Britain in the South Pacific sew *wounds* with banana fiber thread and a needle of flying-fox bone.

University of California chemists have found that methyl bromide *gas* brings out a blush on peaches, but damages the flavor; so a gas is now sought to brighten color without damage.

Scientific experts on physics, engineering, biology, and chemistry all serve on the British *Camouflage* Committee.

The least explored area along the entire route of the proposed *Pan-American highway* is in the Darien Indian region of Panama.

Horses are so terrified by the odor of camels that the Persian King Cyrus won a battle by using baggage camels to frighten enemy cavalry.

The American Forestry Association is making a nation-wide search for the *largest trees* of 200 species in this country, hoping to preserve these 200 giants.

British scientists say that a *plate glass* window within 200 feet of a bomb explosion has little chance of survival.

The *pineapple* got this name because Spanish explorers thought the fruit looked like a pine cone and called it "pina."

To prevent rickets and bone deformities, *dogs* must have sufficient vitamin D, calcium and phosphorus in their diet, a nutritionist warns.

Greenland, which appears twice as big as the United States in some map projections, is actually less than one-fourth the size of this country.

QUESTIONS DISCUSSED IN THIS ISSUE

Most articles which appear in SCIENCE NEWS LETTER are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.

AERONAUTICS

How fast can a fighting plane climb? p. 341.

ARCHAEOLOGY

What new characters in American prehistory have been introduced? p. 349.

ASTRONOMY

By how much were astronomers wrong in predicting the time that Mercury would cross the sun's face? p. 343.

What institution will be located at Blue Hill? p. 345.

What unusual opportunity will December bring to those who watch the skies? p. 346.

GENERAL SCIENCE

How do scientists know of a star they have never seen? p. 339.

How does a flying lemur "fly"? p. 340.

How many amateur scientific groups are there in Philadelphia? p. 344.

What are cosmic rays? p. 339.

What is the lowest temperature possible to attain in the laboratory? p. 339.

ICHTHYOLOGY

Who says that sailors can take a walk on the back of a live shark? p. 345.

MEDICINE

In what common food was an anti-stomach-ulcer vitamin found? p. 345.

What causes acne? p. 342.

What new remedy for tuberculosis is being studied? p. 344.

What new weapon has been found against leukemia? p. 350.

PHOTOGRAPHY-MEDICINE

In what new way are color movies being used to add to medical knowledge? p. 341.

PHYSICS

How can X-rays be used in television? p. 344.

What is the composition of the iron in meteorites? p. 344.

PHYSICS-PSYCHOLOGY

How can singers be given on the concert stage, the acoustical advantages of the bathroom? p. 342.

PHYSIOLOGY-PSYCHOLOGY

What effect may the noise of bombardment have on babies yet unborn? p. 348.

RESOURCES

Why are the Japanese making their silkworms make wool substitutes? p. 340.

SCIENCE NEWS LETTER

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GENERAL SCIENCE

Astronomer Finds Evidence of Star That "Wasn't There"

Systematic Fluctuation in Movement of Double Star Interpreted as Pointing to an Invisible Companion

THOUGH it "wasn't there" in his photographs, Dr. K. Aa. Strand, of the Sproul Observatory of Swarthmore College, has found a previously unknown star from the study of these same photographs. He announced his discovery at the meeting of the American Philosophical Society in Philadelphia.

The star is an invisible companion to a well-known double star, Zeta Aquarii. Member of the constellation of Aquarius, the water-carrier, this consists of two separate suns, which revolve around each other once in 400 years. Though first observations of them were made in 1779 by Sir William Herschel, Dr. Strand's photographic measurements are the most accurate so far. They are nearly ten times as precise as the best made hitherto.

In correlating these with the earlier figures, he found that the movement of the two stars was not uniform, but that there was a regular fluctuation from the expected motion, over a period of 25 years.

These deviations, declared Dr. Strand, "are entirely too large and too regular to be explained as systematic and accidental errors of observation, but they are satisfactorily interpreted as perturbations caused by a third invisible member of the system." That is, the gravitational pull of the unseen star pulls the others back and forth as it goes around them.

He concludes that the invisible companion has about one-half the mass of the sun, while that of the entire system is four times the sun's mass. Its distance is about 85 light years. The two bright stars, which can be seen in a telescope, are separated by a distance about 90 times that between the sun and earth. The third star revolves around the brighter of the visible pair, at about 12 times the sun-earth distance, or about 1,100,000,000 miles.

Only twice before, said Dr. Strand, has a dark companion been found in such a way around a similar double star. The first such discovery was made in 1881, of a star in the constellation of Cancer, the crab; and the second was in 1905 of one in the great bear, Ursa Major.

Science News Letter, November 30, 1940

STAR THAT WASN'T THERE

It doesn't show in this picture which portrays two suns that circle round each other and that now have been found to have an invisible companion. Magnified about 180 diameters, the grains of the photographic emulsion show as fine specks.

Clue to Cosmic Rays

A NEW clue to the exact nature of the mysterious cosmic rays was contained in a paper presented at the meeting of the American Philosophical Society by Dr. Serge A. Korff, of the Bartol Research Foundation of the Franklin Institute.

Cosmic rays, as observed at the earth's surface, are made up of several different kinds of particles, including neutrons, which have no electrical charge; electrons, which have a charge, and mesotrons, which are about 200 times as heavy.

Sometimes the electrons come in showers, which are bigger the higher the altitude at which they are observed. These are supposed to be caused by the action of other electrons on the nuclei of atoms in the atmosphere. Dr. Korff has found that the number of neutrons increases with altitude in about the same way as the cosmic-ray showers, and that neutrons are often associated with the showers.

Thus, he advanced the suggestion that the neutrons are also produced by a disintegration of the atomic nuclei in the atmosphere. Observations of cosmic rays made at sea level and also on top of Mt. Washington show them closely in accord with predictions based on this theory.

Science News Letter, November 30, 1940

Study Lowest Temperatures

THE physics laboratory of Columbia University will soon be one of the few spots in the world where the lowest possible temperatures, hundreds of degrees below zero, can be attained. Dr. Henry A. Boorse, in charge of this work, gave details of the new equipment, made possible in part by a grant from the American Philosophical Society.

This, he said, "will place at our disposal the complete range of temperature from the ice point to within a few hundredths of a degree of the absolute zero." The latter temperature, 459.72 degrees below zero of the Fahrenheit scale, is the point at which all molecular movement ceases. Below this it is impossible ever to go.

Many of the researches will be concerned with the strange behavior of liquid helium, at temperatures of only a degree or two above absolute zero. For example, if a beaker containing some is just partially immersed in a bath of the same liquid, it will creep up over the edge, until the levels are the same. Many metals at the low temperatures cease to have electrical resistance, while with some, notably gold, the resistance vastly increases when the very lowest temperatures are reached.

Science News Letter, November 30, 1940

"Solid" Bone Is Plastic

BONE is by no means the solid, unyielding, unchanging stuff it has long been assumed to be, Dr. Charles B. Davenport, Carnegie Institution of Washington geneticist, told the American Philosophical Society. Instead, it is a decidedly plastic material, molding and remolding itself readily, though slowly, in response to external conditions.

Dr. Davenport cited especially the behavior of the slender, transverse bracing rods that are found in many parts of the skeleton, especially the limb bones. Because they resemble the bracing timbers of a house or bridge not only in form but in function, they have been given the name "trabeculae," which means "little beams."

If a broken bone is badly set, so that muscular strains no longer affect it in the

same directions, new trabeculae will be formed within it, thrusting in the lines of the new strains, Dr. Davenport stated. He also cited the cases of two crippled young women, one of whom had been bedridden all her life, the other since she was ten years old. The first patient has a heel-bone shaped roughly like that of a normal child but without the properly directed trabeculae. The second, who walked for a short time before she became crippled, has a nearly normally shaped heel-bone, but only a few directed trabeculae.

"The conclusion seems to be justified," said Dr. Davenport, "that the bone-forming cells respond to directive thrusts and pulls that are made upon normally functioning bones by forming the trabeculae in adaptive positions. Thus the bone cells are as truly responsive as muscle cells, . . . but respond to different stimuli in a different way."

Science News Letter, November 30, 1940

Rare "Flying" Mammal

ONE of the rarest of tropical animals, the colugo or flying lemur of the Philippines and the East Indies, was described by Prof. Glenn L. Jepsen of Princeton University, who discussed especially the question of its possible kinship to the bats.

"It is not a lemur and it does not fly," Prof. Jepsen told the Philosophical Society. Instead, he explained, it makes long glides, like a flying-squirrel, aided by a membrane that runs from its neck to its legs and thence to the tail, making a very effective parachute. It also has webbed toes, which add to its supporting surface. An exceedingly curious feature is the comb-like structure of its front teeth.

Some years ago, fossils from 50-million-year-old early Tertiary beds in Wyoming and Montana proved to be of animals related to the so-called flying lemurs but even more primitive. Comparisons of these with the bones of their modern relatives of the Asiatic tropics suggest, Prof. Jepsen reported, "that the 'flying lemurs' are an extremely ancient line, of limited ecologic latitude, and that they are only remotely if at all related to the bats."

Science News Letter, November 30, 1940

* By aid of bleaching powers of sodium chlorite—chemical relative of common salt—America expects to make *wood pulp* comparable in quality to the Scandinavian.

RESOURCES

World's Silk Situation Snarled As If Kitten Had Ball

Japan, With Silk in Abundance, Forbids Weaving of Cotton or Wool Without Mixture of 20% Silk

WHILE American women unconcernedly go on wearing silk stockings, the world's silk situation grows as tangled as though some lively kitten had got the ball.

In Japan, worry over possible loss of such silk customers as the United States and India is leading to talk of finding new customers, presumably in Latin America.

Still the world's leading silk producer, Japan finds itself these days in the strange position of using more of its own silk than it can sell even to its perennial number one silk buyer, the United States.

With silk on its hands and a shortage of clothing, Japan ordered its people on October 1 to spin or weave no more cotton, wool, or rayon without mixing 20% of silk with the fiber. This is expected to use up an additional 100,000 bales of silk in a year, and will probably bring Japan's own consumption of silk up toward 500,000 bales. The United States last year bought about 384,000 bales, and has taken less this year.

Paradoxically, Japanese are forbidden the luxury of fine grade silks. Such materials are to be made for the foreign trade. They will thus bring in much-wanted gold for buying war material.

A new job for silkworms is even among the ways and means Japan is evolving for meeting her silk worries. Quantities of worms are to be used, according to plan, in making wool substitutes. This will help some of the 2,000,000 farm families that customarily raise silkworms among other products, and increase supplies of warm material.

Meanwhile, English women are buying no more silk hosiery or knit silk underwear after December 1, to conserve supplies of silk for military use.

Italy, cut off from selling silk to the United States since August, hopefully stores in warehouses silk we would normally buy. The silk is being reeled the way United States manufacturers like it, all ready in case —. Compared with Japan's major silk production, the silk on Italy's hands is not very great, but it is important to Italy.

If the United States should take the drastic step of cutting off Japanese silk imports, the break in trade would be more serious for Japan than for the United States.

Silk is listed as a strategic material, which this country does not produce and which it needs for such military purposes as parachutes and powder bags. Experiments with Nylon, Vinyon, and other synthetic textiles, however, have given reassuring results that we are not so dependent on silkworms after all.

So far as silk hosiery wearers go—and they are now consumers of most of the silk America gets from Japan—they would find themselves meeting a "silkless" era by various adjustments. Nylon, which has been stepped up in production beyond expectations, is a partial answer to the "what would we do without Japanese silk?" question. Other synthetics, and probably synthetics yet to be invented and improved, are part of the answer.

New fashions, such as anklets, sheer cotton hosiery, possibly a bare leg fad, would figure in the developments.

Some silk, also, can be had from sources other than Japan. China sent the United States over 15% of the silk we imported in the first nine months of 1940, a step up from less than 8% in similar months of last year.

Tropical America, too, may yet establish a silk industry. Ecuador is seen by some agriculturists as one favorable region, because of the dry, cool climate in high altitudes and the low-wage scale of farm labor.

The United States, which has tried to make silk production a paying crop since colonial days, continues to stub its toe against the economic factor. Caring for silkworms continues to be a farm and home business for low-paid workers. People who ask why Puerto Rico would not be a good place for a silk industry forget that the Wages and Hours law applies there as in continental United States.

Science News Letter, November 30, 1940

PHOTOGRAPHY—MEDICINE

Color Movies of Disease Show How Malaria Kills

First Moving Pictures of Circulating Blood in a Living Animal Show How Malaria Thickens the Blood

NEW aid to national defense on the medical side may come from color movies shown at the Southern Medical Association meeting in Louisville. They are the first motion pictures ever taken of disease in the circulating blood of a living animal.

The disease is malaria, the old "chills and fever" which scourged American troops during the Spanish American War. With the supply of quinine, chief anti-malaria chemical, threatened by present war conditions, medical authorities planning for national defense have been worrying over the problem of protecting American troops from malaria if they should be sent to Central or South American tropics on hemisphere defense duty.

The color movies were taken by Dr. Melvin H. Knisely, University of Chicago anatomist now on loan to the University of Tennessee, Dr. Warren K. Stratman-Thomas, malaria expert of the Tennessee Valley Authority, and Dr. Theodore S. Eliot, associate professor of histology at the University of Tennessee.

They show that malaria kills by turning the fluid blood into a thick sludge which plugs up the tiny arteries and veins. Then, contrary to popular conception, the heart is literally worked to death trying futilely to push more blood against the blockade of this malarial sludge in the veins and arteries.

As the disease progresses, the color movies show, the power of the blood's scavenger cells to engulf the clumps of sludge-sticky red blood cells lessens or vanishes. Gradually much of the life-sustaining blood passages are blocked off.

This stage in the progress of the disease is known as the crisis. In some cases, the scientists reported, the crisis is successfully passed but the ensuing oxygen starvation, caused by exhaustion of the red blood cells, brings death.

Heparin, newly-purified anti-blood-clotting chemical, prevents the formation of the dangerous malarial sludge in the blood. When heparin is used, however, the malaria parasites, or germs, multiply and kill by devouring the oxygen-carrying hemoglobin in the blood. Heparin makes it possible, however, to differentiate the mechanical and chemical effects of the disease and to study them separately.

New knowledge of the scavenger cells of the blood, as well as of malaria was obtained from these color motion pictures, made possible by Dr. Knisely's adaptation of the quartz rod light for observing and photographing blood in the veins and arteries of living animals.

The scavenger cells, it now is seen, "know" which material in the blood stream to grasp and which to leave alone as being harmless by a sticky substance which coats injurious substances such as germs or particles of carbon.

The changes produced in blood by other diseases than malaria, and the way some drugs or chemicals can counteract these, may now be observed in living

(*Turn to next page*)

CLIMBS AT MILE A MINUTE

This is the latest type of Curtiss-Wright interceptor-fighter which can climb over a vertical mile in 60 seconds and is said to be the fastest climbing plane in the world. It is powered with a Wright Cyclone engine and has a speed of 330 miles per hour. It has four machine guns which fire through its propeller disk.

AERONAUTICS

Interceptor-Fighter Plane Climbs at Mile a Minute

THE fastest climbing airplane in the world, able to ascend more than a vertical mile in a minute, has just had its first public demonstration.

Made by the St. Louis Airplane Division of the Curtiss-Wright Corporation, and known as the Curtiss Model 21B, it is a highly streamlined, single-place, low-wing monoplane, powered with a Wright Cyclone engine. It is one of a large number now being built, it is said, "for a foreign government." Presumably this is England.

A speed of 330 miles per hour can be attained, which gives it great maneuverability, and increases the difficulty of ground forces in locating the ship. It has four machine guns, which fire through the propeller disk, as well as radio equipment and the latest military aircraft accessories.

During test flights, the St. Louis factory received many inquiries about "a mysterious plane that could be heard but not seen."

animals by the use of the techniques developed by Dr. Knisely and associates. Better defenses against many diseases may result.

Science News Letter, November 30, 1940

New Theory of Acne

A NEW theory of acne, which lays its cause to an upset of glands and chemical processes akin to that in diabetes, and a new treatment which succeeded in more than 400 cases, was announced by Dr. Richard L. Sutton, Jr., of the University of Kansas Medical School, at the meeting of the Southern Medical Association.

Acne, along with greasy skin and blackheads, is due, Dr. Sutton believes, to "failure of the bodily chemical economy to manage oils sucessfully," just as in diabetes the body fails to handle sugars and starches successfully. In diabetes, the glands called the Islands of Langerhans, in the pancreas, are disordered. In acne, Dr. Sutton believes, the disordered gland is the thyroid.

Diabetes is controlled by reducing the intake of sugars and starches, enhancing the body's ability to handle these, if necessary, by giving insulin. Acne is controllable, he finds, by reducing the intake of fatty foods, enhancing the body's ability to handle these, if necessary, by giving thyroid gland extract.

Some patients with acne are not helped by the low-fat diet plus thyroid extract. These are the redheads with very fine-textured skins. They are helped, Dr. Sutton discovered, by a diet low in carotinoids, the chemicals which give color to carrots and spinach and from which vitamin A is formed.

The low-fat diet, Dr. Sutton warns, can lead to serious trouble if it is not followed under a doctor's supervision. But no ill effects developed, he reported, in the more than 400 patients who followed it under his supervision and they were "relieved of fatigability, constipation and mental depression to a noteworthy degree, while at the same time their acne gave ground."

Science News Letter, November 30, 1940

Lotions Prevent Acne

ACNE can be prevented in many cases by starting children between the ages of 7 and 11 years on the regular use of lotio alba or other mild sulfur preparations for their faces, Dr. Andrew Louis Glaze, of Birmingham, Ala., declared.

Satisfactory results with this prophylactic treatment for 10 years in 200 cases has convinced him that acne can be mitigated and in many cases prevented, although cystic acne is not prevented by the procedure.

Young patients are advised to continue using the lotions through adolescence. The idea of prophylactic treatment is based on the general agreement among skin specialists that the earlier acne is treated, the better. Dr. Glaze believes in starting the treatment ahead of the early stages of acne, at the time when the ground is being paved for development of the condition.

Science News Letter, November 30, 1940

PHYSICS—PSYCHOLOGY

Artists, Like Rest of Us, Sing Best in the Bath

Public Address System Inaudible to Audience Enables Singer To Hear Himself as Though in Small Room

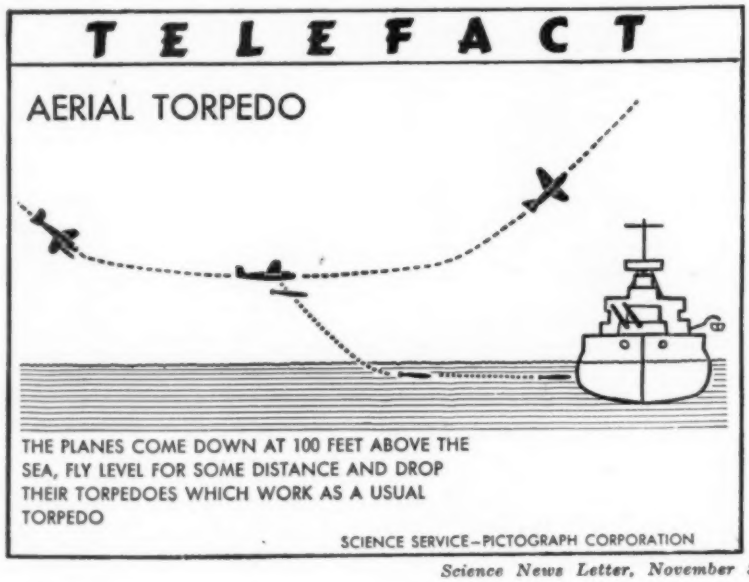
VOCALISTS on the concert stage will produce the best effect upon their audience if the stage is just one big bathroom, acoustically speaking. This is the latest advice from science to art.

Concert singers, like ordinary mortals, sing their best in the bathroom. Thus, their performance in public is better if the stage is made the equivalent acoustically to the bathroom, Harold Burris-Meyer, of Stevens Institute of Technology, Hoboken, N. J., has found.

Speaking before a meeting of the Acoustical Society of America in Chicago, he told how this effect is obtained, using a technique originated by Paul Robeson, and employed by him last month in a Carnegie Hall recital.

The Robeson technique, as Mr. Burris-Meyer has developed it, consists in using a public address system with the loud speaker about fifty feet away from the singer. This is aimed at him, so he gets the effect of the reverberation of a small room, and can hear himself. The volume of the reproduced sound is kept low enough that the audience is not aware of it.

"The results of not being able to hear," said the speaker, "are the catalogue of the artist's woes: tension, inability to relax, a feeling of being ill at ease, of low vocal efficiency, forcing the voice in an effort to project, using a higher key than is best for the song in an effort to get out more volume and fill up the house. Some singers carry all the pieces in their repertoire in a number of keys and use the one which is nearest the resonant frequency of the hall, despite the fact that few singers can sing the same number equally well in more than one key.


TELEFACT
AERIAL TORPEDO
THE PLANES COME DOWN AT 100 FEET ABOVE THE SEA, FLY LEVEL FOR SOME DISTANCE AND DROP THEIR TORPEDOES WHICH WORK AS A USUAL TORPEDO
SCIENCE SERVICE–PICTOGRAPH CORPORATION

Science News Letter, November 30, 1940

"The concert artist does not really doubt his ability to fill the house. The inability to hear himself, however, bothers him, sometimes enough to lead him into faults which militate against a good performance."

Mr. Burris-Meyer finds that the method works best when only the higher frequencies of the voice, those above 500 cycles per second, reproduced. At the relatively low intensities used, the absence of low frequencies is not apparent, he stated, and if they are used they are more likely to spill over and be heard by the audience.

"The enthusiasm of the artists who have tried it beats anything of the sort I have encountered," Mr. Burris-Meyer declared. "We inveigle them into trying the technique and they won't go home. We have heard expressions like 'I could sing all night' and 'Why, it shrinks the room way down.' These are standard first reactions. The enthusiasm of the artists seems to be justified. In the first concert in which the technique was tried at Carnegie Hall, Mr. Robeson was able to sing 'Water Boy' in a lower key than he had ever used before for that number in concert.

"It is important to emphasize the fact that the technique has no effect on the sound as the audience hears it."

Science News Letter, November 30, 1940

ARCHAEOLOGY

Americans Have Salvaged Much of Athens' History

Ten Years of Digging in Athenian Market Place Have Brought To Light Impressive Array of Relics

WHILE Athens lies in the zone of devastating war, American scientists in Philadelphia listened to the deeply impressive summing up of history and art relics that Americans have saved in ten years digging in the old, buried Athenian Market Place.

Eight thousand Greek treaties, decrees, and other records have been unearthed, greatly enriching Athens' history, Dr. T. Leslie Shear, director of the American School of Classical Studies at Athens, told the American Philosophinal Society. His expeditions, which have excavated a 25-acre area to examine the long-lost civic and trade center of classical Athens, have recovered much sculpture, including unique masterpieces, and well-preserved vases showing art progress from 4000 B. C.

The plan of the Market Place has been accurately mapped, and the appearance of this scene of so many historic Greek events can be vividly shown on paper, now. About 90,000 coins from all over the Mediterranean world have been unearthed, furnishing significant evidence of trade history. War conditions interrupted the excavations this summer.

Science News Letter, November 30, 1940

King Solomon's Naval Base

CONTINUING to dig this spring at Solomon's seaport of Ezion-geber, despite disturbed international conditions, Dr. Nelson Glueck of the American Schools of Oriental Research learned more about King Solomon's ancient Hebrew Empire and trade expansion ventures in the Near East, he reported.

Ezion-geber was a strong fortress and an important naval base, Dr. Glueck has determined. Located by one horn of the Red Sea in Transjordania, this city which Solomon built far beyond Palestine could guard the junction of roads leading to and from Arabia. Copper and iron ingots and metal objects which were turned out in the factory area of Ezion-geber were loaded on Solomon's ships and dispatched through the Red Sea to Arabia, returning with incense and other precious wares.

In Ezion-gebef's ruins, Dr. Glueck reported unearthing a signet seal-ring of Jotham, king of Judah, Aramaic writings on scraps of pottery, and the rare find of a Minaean inscription, a fragment of writing of a Semitic people of Arabia who established an extensive empire there.

Science News Letter, November 30, 1940

Ancient Seals Arranged

THE largest collection of Mesopotamian cylinder seals in the United States, in the Pierpont Morgan Library, is being catalogued, Miss Edith von Porada reported to the American Philosophical Society. More than a thousand records of Babylonian and other ancient Tigris-Euphrates peoples who wrote on clay are in the collection.

Science News Letter, November 30, 1940

ASTRONOMY

Mercury Transit Films Indicate Planet Was Early

WHEN the planet Mercury passed in front of the sun on Armistice Day, it was about half a minute earlier than the time predicted in advance, according to observations made at the Mt. Wilson Observatory. (*See SNL, Nov. 23 for photograph.*)

Astronomers do not regard this difference as very important, however, since the atmospheric conditions through which the light passes could easily make it this much early or late. Though cloudy weather over much of the nation prevented many planned observations by amateurs as well as professional astronomers of the transit of Mercury, it is hoped that a number of them secured satisfactory results. By averaging these, accidental differences may be ironed out, and a precise value obtained. This is important in checking both the rotation of the earth and the movement of Mercury.

The Mt. Wilson photographs were made with the two tower telescopes, one 60 feet, the other 150 feet in height, which are especially designed to observe the sun. A preliminary reduction of these films was made by Dr. Seth B. Nicholson, who finds that Mercury was completely on the face of the sun beginning at 12 hours 50.4 minutes p.m., Pacific Standard Time. According to advance prediction, it should have been 50.9 minutes.

Science News Letter, November 30, 1940

Some primitive languages have no *word* for "word."

Welding, instead of riveting, may be tried in construction of Army tanks.

●RADIO

D. B. Mason, director of Freeport Sulphur Company, will describe a flotation process pioneered in Cuba to improve low grade manganese ores to make them suitable to be made into ferromanganese for use in steel manufacture, as guest scientist on "Adventures in Science" with Watson Davis, director of Science Service, over the coast to coast network of the Columbia Broadcasting System, Thursday, Dec. 5, 3:45 p.m. EST, 2:45 CST, 1:45 MST, 12:45 PST.

Listen in on your local station. Listen in each Thursday.

MEDICINE

New Sulfa Drug Promising As Tuberculosis Remedy

A NEW drug of the sulfanilamide group, called promin, is under investigation as a possible tuberculosis remedy. Trials in guinea pigs with experimental tuberculosis appear promising, according to results reported by Dr. W. H. Feldman, Dr. H. C. Hinshaw and Dr. H. E. Moses, of the Mayo Foundation.

Guinea pigs with experimental tuberculosis lived longer when treated with promin than those not so treated. All of the 20 untreated animals were dead in 82 days, but 13 of the 29 promin-treated animals were living after 164 days, suggesting, the Mayo doctors cautiously state, that the drug was of value as a remedy.

The severity of tuberculosis when it developed in the treated animals was, with one exception, "impressively less" than among the animals not treated with promin, it was found in examination of the animals after death.

The promin, supplied by Dr. E. A. Sharp, of Parke, Davis and Company, Detroit, was given by mixing it with the animals' food. No sign of poisoning from the drug was seen.

Sulfathiazole was also investigated as a possible remedy for experimental tuberculosis in guinea pigs. This sulfa drug, however, had little, if any effect on the expected course of the disease.

Science News Letter, November 30, 1940

PHYSICS

Television by X-Rays One of Week's Inventions

X-RAY beams may form the fingers that paint pictures of distant scenes on viewing screens of television receivers, if a newly patented invention comes into wide use.

The X-ray system, just granted U. S. Patent 2,221,374, was made by Philo T. Farnsworth, well-known television experimenter, of Springfield Township, Montgomery County, Pa. His rights were assigned to Farnsworth Television and Radio Corporation, of Dover, Del.

In his specifications, Mr. Farnsworth points out disadvantages of two of the most common present types of television receiving tubes. In one, a beam of electrons, made to fluctuate by the incoming signal, is sprayed on a screen that glows where they strike. The electrons travel freely only in a vacuum, which means that the screen must also be inside the tube. Thus, with a large screen, an equally large (and expensive) tube is required. In another arrangement the image screen is made small and very bright, and lenses are used to project the image to a screen which may be in the air. This, however, requires the use of expensive projection lenses.

To avoid these difficulties, Mr. Farnsworth uses X-rays, which are generated by electrons hitting a metallic target. So he sprays his electron beam not on a fluorescent screen, but on a metal target. X-rays are emitted where there should be bright parts of the picture.

This tube is entirely surrounded by lead, except for a small hole at the front, through which a pencil of the X-rays may pass. It is really a pin-hole camera, and an X-ray image, the sharper the smaller the hole, is formed on a viewing screen like that used in hospitals for examinations of the inside of the body. As X-rays travel freely through air, only the part containing the electron gun and the metal target need be enclosed in a vacuum.

Recognizing a loss of efficiency in the method, because only a small portion of the X-rays, which are emitted in all directions, go through the pinhole, he also suggests two schemes, making use of the ionization of liquids or gases, to increase the brilliance of the final picture.

Science News Letter, November 30, 1940

GENERAL SCIENCE

New Directory Lists Amateur Scientific Groups

AMATEUR scientists have opportunities to carry on their work in 287 organized groups in one area, it has been found from a survey conducted under the auspices of the American Philosophical Society. The first results of this survey, which began more than a year ago, are contained in a booklet just issued, "The Layman Scientist in Philadelphia." (*Reviewed, SNL, this issue.*)

More than 32,000 persons are included in these groups. They have access to 72 different museums, libraries, observatories and other science resources. Over 120 courses in 19 science fields are open to them.

Made possible by a grant from the Carnegie Corporation of New York, the survey is in charge of a committee headed by Dr. Edwin G. Conklin, vice-president of the Society, with W. Stephen Thomas as executive secretary.

Science News Letter, November 30, 1940

IN SCIEN

PHYSICS

Meteoric Iron Composition Similar to Iron on Earth

IRON in meteorites which have fallen from the sky is similar in its composition to iron from terrestrial sources, G. E. Valley and H. H. Anderson, of Harvard University, told American Physical Society meeting in Chicago.

Practically all elements consist of several chemical "twins," called isotopes, which are made of atoms slightly different in weight. Iron consists mostly, more than 90%, of the isotope of atomic weight 56. The rest is largely 54 and 57, with a slight amount of 58. The experimenters determined the isotopes in both meteoric and terrestrial iron, and found them to be nearly the same.

The slight differences, they said, "can be accounted for by instrumental effects. We conclude that the abundance of the stable isotopes of iron does not depend upon the place of origin of the specimen within the solar system."

Science News Letter, November 30, 1940

ENGINEERING

Electric Eye Control Becomes a Handy Man

See Front Cover

A NEW electric eye control is only half the size of a loaf of bread and is designed to fill many and varied jobs in the home as well as in industry.

The instrument, developed by engineers of the Westinghouse Electric and Manufacturing Company, serves as safety engineer by automatically stopping the jaws of the giant stamping machine pictured on the front cover of this week's SCIENCE NEWS LETTER every time the workman reaches his hand into danger.

In the home, the same instrument can be made to open the dining room door for the housewife with her hands full of dishes, to open the garage at the approach of your car, or to turn on the light for you when you go down cellar.

The new convenient instrument is known by the trade name of Photo-roller.

Science News Letter, November 30, 1940

E FIELDS

MEDICINE

Anti-Stomach-Ulcer Vitamin Is Discovered in Milk

DISCOVERY of a new vitamin which prevents stomach ulcers in guinea pigs was announced by Dr. S. B. Randle, Dr. H. A. Sober, Dr. C. A. Elvehjem, and Dr. E. B. Hart, of the University of Wisconsin.

Milk is a good source of the new vitamin, a point of interest to human stomach ulcer sufferers whose treatment usually starts with a milk and cream diet, although the University of Wisconsin announcement does not state whether or not the new vitamin will protect humans as well as guinea pigs from ulcers.

Guinea pigs on a diet lacking the new vitamin not only developed stomach ulcers but also suffered damage to liver and kidneys, further studies, in which Dr. J. Shaw and Dr. Paul Phillips cooperated, indicated.

A seasonal variation in the tendency to develop stomach ulcers was noted in the guinea pigs. At certain times of the year even some of the animals kept on milk rations developed ulcers.

Science News Letter, November 30, 1940

ICHTHYOLOGY

Sailors Take Walks On Backs of Big Sharks

WHALE SHARKS, biggest of all fish, are also apparently the laziest and most easy-going. So indifferent to human proximity are they that in at least two well-authenticated instances sailors from fishing boats have stepped out and walked around on their broad backs as they floated at the surface, reports Capt. R. W. Mindte of the motor vessel Invader, to the *Hydrographic Bulletin* of the U. S. Navy.

Capt. Mindte has had ample opportunity to observe these gigantic sharks, which reach a length of as much as 40 feet, during his years of tuna fishing out of San Diego, into the waters off the southern end of Lower California. Presence of whale sharks is even used as an indicator of good tuna fishing, for long experience has taught fishermen that one of these giants will usually be surrounded by a school of desirable yellow-fin tuna.

A whale shark does not seem to mind having a fishing vessel lay alongside, or even bump into it, reports Capt. Mindte:

"I have often struck these sharks with the boat while coming alongside and struck them hard enough to feel the blow all over the boat, but this never seemed to bother them. The sharks seem to enjoy laying alongside a boat. I have poked them on the head and on the body with my fishing pole many times without any reaction from the shark.

"One time, however, a fisherman on my boat struck one of the sharks with a fishing pole just forward of the vertical rudder-like tail fin. The results were almost disastrous, for the shark threshed his tail violently, barely missing other fishermen in the fishing racks, and then sounded deeply.

"I know of two authentic occasions when fishermen have stepped off the fishing racks on to the backs of these sharks and walked and jumped on them, the shark apparently taking no heed of this action."

Science News Letter, November 30, 1940

PHYSICS

Sealed Beam Infra-Red Lamp Speeds Curing of Rubber

WITH sealed beam units similar to those on modern automobiles, giving off invisible infra-red heating rays instead of the visible lights for illumination of highways, sheet rubber can be cured in two minutes instead of the two hours formerly required. Baking of enamel on automobiles, refrigerators, washing machines and furniture is speeded. It is even possible to bake cookies and crackers with this radiant heat, Paul H. Goodell, of the C. M. Hall Lamp Company of Detroit, said at a meeting at The Franklin Institute.

Previous infra-red lamps gave off a great deal of visible light too, he explained. In use, they were often fogged by the fumes from the paint. In the new Hall Thermalamp, which he demonstrated, these difficulties are eliminated.

The lamp consists of a double glass envelope, the inner one more of the usual type. Sealed around this is a shell with a gold reflector, which is highly efficient for the long infra-red waves. The front of this shell is opaque to visible light, but the heat rays pass freely.

The device was originally developed and patented by the Ford Motor Company, and the Hall Company has continued the development under a license from them.

Science News Letter, November 30, 1940

PHYSICS

Eclipse Affects Cosmic Rays Bombarding Earth

AN EFFECT of total solar eclipse upon the powerful cosmic rays that incessantly bombard the earth from outer space has been discovered by a team of scientists from the University of Sao Paulo, Brazil.

This effect, hitherto sought without success, was reported by Prof. G. Wataghin in a cable to Prof. Arthur H. Compton, University of Chicago Nobelist, who relayed the information to the *Physical Review* (Nov. 1).

Observations of the penetrating cosmic rays made underground show that their behavior was different from that of the total radiation.

Science News Letter, November 30, 1940

ASTRONOMY

Solar Observation Station Moved to Blue Hill

SOLAR observation headquarters of the United States Weather Bureau have been moved from Washington, D. C. to the Blue Hill Meteorological Observatory of Harvard University, in Milton, Mass. Henceforth the government's solar observing equipment will be calibrated at Harvard. And routine solar reports of other government observatories will be received and edited there. Two government technicians, Irving F. Hand and Mrs. Helen Cullinana, of the Washington bureau, will operate government equipment at Harvard.

Prof. Charles F. Brooks, director of the Harvard station, said that the government weather officials, in making the change, considered the advantageous observing conditions on Blue Hill, which is relatively free from smoke; and also the intensive solar radiation work being conducted there by both Harvard University and the Massachusetts Institute of Technology, under grants from Dr. Godfrey L. Cabot, of Boston. Harvard has been studying the intensity of solar radiation for eight years at Blue Hill, in a program initiated by Dr. Herbert H. Kimball, who retired from the government weather service in 1932, and from Harvard last year.

The solar observations include measurement of the intensity of radiation on a horizontal plane and on a plane perpendicular to the sun's rays; and also of the dust and moisture content of the atmosphere.

Science News Letter, November 30, 1940

ASTRONOMY

Bright Comet Coming

First Since 1910, Younger Generation Will Have an Astronomical Treat as Object Shines in Western Sky

By JAMES STOKLEY

IF YOU are thirty years old, or less, you will be able during December to see something in the sky that you never saw before.

This "something" is a bright naked eye comet, Cunningham's comet, to be specific, discovered in the middle of September by Harvard astronomer Leland E. Cunningham, after whom it is named. Ever since then it has been approaching closer both to sun and the earth. In early December it will begin to be seen by the naked eye. By Christmas, astronomers expect, it will be conspicuous in the western sky after sundown.

A dozen or more bright comets appeared during the 19th century, but the 20th thus far has been considerably behind its quota. In 1910 there were two. One was the famous Halley's, on one of its regular 75-year visits. The other is recorded as 1910a, since it was the first to be discovered that year.

150 Comets Since

Since then, about 150 times astronomers have watched a comet as it swept around the sun. A third of these were returns of periodic visitors, and the rest were unheralded. Many of these are periodic, too, but their cycles are so long, counted into thousands of years, that no one had known how to calculate their motions when they were last here.

Not more than half a dozen in recent years reached the brightness needed for visibility without a telescope. One of these was discovered by an Ohio amateur, Leslie C. Peltier, in 1936. The following year a Swiss, Dr. P. Finsler of Zurich, found one. And in 1939 came a third, discovered independently by observers in Norway, Canada, Russia and elsewhere. But none of these were conspicuous. Each could be seen as a hazy blob of light, if the sky was clear and dark, and you knew where to look. People who remembered Halley's in 1910 felt justifiably disappointed.

Best Since Halley's

Even Cunningham's comet may not rival Halley's but at least it will do better than any since. Early in its visit a tail began to appear, and this has been enlarging. In a few more weeks you will see it pointing away from the sun, as a comet's tail always does.

In the northwestern sky, in the early evening, shines a bright star, Vega, in Lyra, the lyre. Almost directly west is Altair, in Aquila, the eagle. This star has a fainter one to the right, and another to the left. These will help you to find it. Between the lyre and the eagle, and a little higher, is a group shaped like a cross. Often called the northern cross, it is really part of Cygnus, the swan. A bright star, Deneb, marks the top of the cross, a fainter one, Albireo, the foot.

Around December 9, as the comet begins to be visible easily, it will pass near Albireo; at Christmas time it will be in Aquila, underneath Altair. By early January it will be entering the figure of Capricornus, the sea goat, but then it will be close to the sun. Despite the fact that it will then be reaching greatest brilliance, it will be lost to view. By the beginning of February it will be drawing well away from the sun again, but will be so far south that we will not see it. People in the southern hemisphere then will find it in the east before sunrise.

At the time Mr. Cunningham discovered it in early September, it was some 220,000,000 miles from the sun and 170,000,000 miles from the earth. Its December first position is only 116,500,000 miles from the sun and 115,000,000 miles from the earth. By Christmas day it will have moved a distance of 63,500,000 miles from the sun, and 73,500,000 miles from us.

Even though this comet may become quite conspicuous, it is a pretty flimsy sort of thing after all.

Light Shines Through Them

Sometimes one passes right in front of a star, but there is no eclipse. Instead, the star light shines through with undiminished brightness.

A comet has been compared with a shovelful of gravel, tossed through the air. It consists of a lot of separate particles some, perhaps, as large as big boulders, but the distances between these pieces are large compared to their diameters. Dr. Henry Norris Russell, of Princeton, has estimated that the brightness of Halley's comet could be explained if in every cubic mile of its volume there were a dozen bodies as big as small marbles, and nothing else!

ESSAYS ON THE NEW VORTEX ATOM

by Carl F. Krafft

CONTENTS

Fundamentals of the New Vortex-Atom Theory
Protons, Electrons, and Neutrons
Hydrogen and Helium
Vortex-Atom Structures from Lithium to Neon
Valence Bonds, Solubility, and Wettability
Orthohydrogen and Parahydrogen
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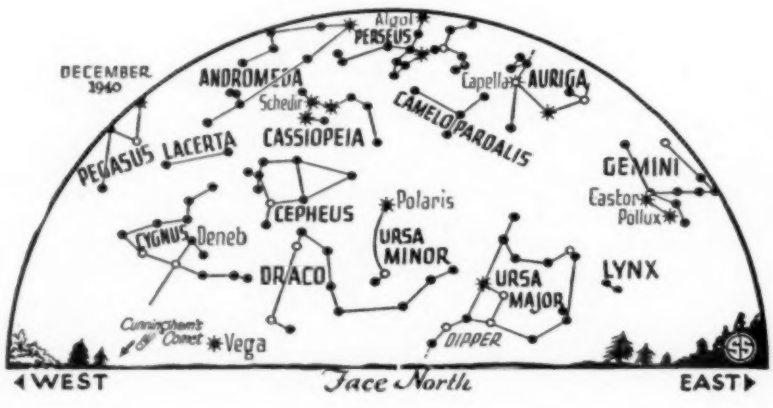
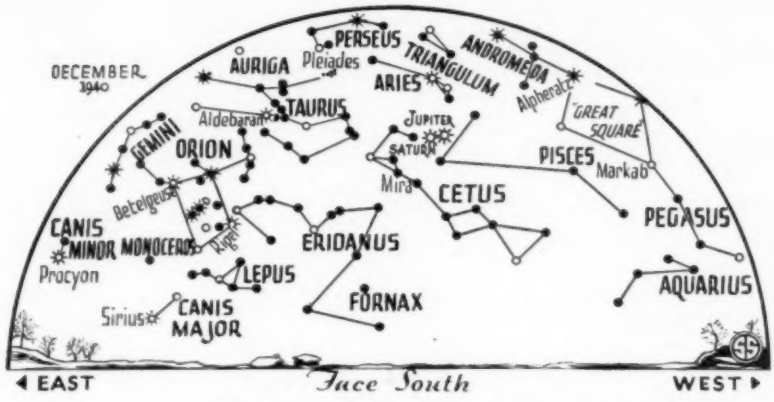




☼ ✱ ○ • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

Comets have passed close to the moons of Jupiter, and have had their paths radically changed, yet not the slightest effect could be detected on the moons. Compared to them, therefore, the comet's mass is insignificant.

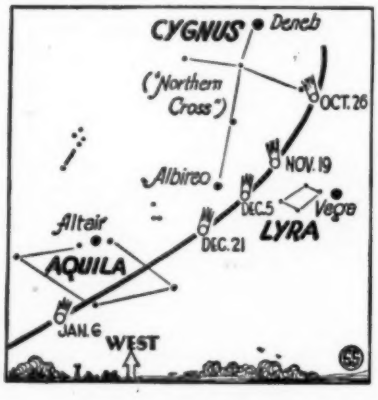
Enough to Fill Canal

Still, this allows for a lot of stuff. If you could bring Cunningham's comet to earth, it might weigh as much as a hundred million tons. Piled in one place, it might be roughly equal to the amount of rock and soil excavated in digging the Panama Canal. A comet is nothing to be afraid of, unless one should hit the earth. Small comets have doubtless hit the earth in the past, but the chance of one doing so is extremely remote.

As the comet comes in toward the sun some yet unknown force, perhaps resulting from an excitation by the sun's rays, drives finely divided dust, and gases, out of the head. Then another force operates. This is the actual pressure of the sun's light. So small is this pressure that we cannot feel it. At earth's distance, the pressure of sunlight over a square yard is only a hundred thousandth of an ounce. But out in space this is enough to push on the dust and gas like wind. That is why the comet's tail always points in the direction away from the sun. As it approaches the sun, the tail is behind. Leaving the sun, the tail is ahead: it backs away, like a commoner from an audience with royalty. Far out in space again, the force that ejects the tail disappears.

It seems likely that comets are actually members of the solar system, like the planets, and are not, as some have suggested, bodies that have entered the system from outside. Probably they were formed in the same way, whatever it was, as the planets themselves.

Thus, with a comet giving off some of its material each time it rounds the sun, it seems as if they cannot go on forever. Millions and millions of years ago the sky may have been much more peopled with them than now; millions of years in the future they may be gone. But that time has not yet come, and we can enjoy Cunningham's comet with the feeling that it may be the herald of even finer comets that are on the way—comets to rival the greatest seen in the 19th century.



PATH OF COMET

This map shows the arrangement in the western sky of the constellation around 7:00 p.m., on December 1 and about an hour earlier on December 15.

Planets Still Visible

Our maps, as usual, show the sky's appearance at 10:00 p.m. on December 1, 9:00 p.m. on the 15th and 8:00 p.m. on the 31st.

In addition to the comet, the planets Jupiter and Saturn are seen, still close together in the constellation of Aries, high in the south. Jupiter, the more brilliant of the pair, is easily recognized. On Tuesday, Dec. 10, the moon, four days before it is full, will pass near Jupiter, to the south. Later that night it will pass even closer to Saturn. In the southern part of the United States, south of latitude 36 degrees, there will be an occultation of Saturn, that is, the moon will actually pass in front of the planet.

Most brilliant of the stars seen on December evenings is Sirius, the dog star, in Canis Major, the big dog. Above it is the group of constellations that make the skies of winter so glorious. These are Orion, the warrior, with Betelgeuse and Rigel; Taurus, the bull, with Aldebaran; Canis Minor, the lesser dog, with Procyon and Capella, in Auriga, the charioteer. To the northwest are seen two other stars of the first magnitude. These are Deneb, in Cygnus, the swan, and, near the horizon, Vega, in Lyra, the lyre.

Celestial Time Table for December

Monday, Dec. 2, 7:00 a.m., Venus passes Mars (both morning stars). **Thursday, Dec. 5,** 12:19 a.m., Algol at minimum. **Friday, Dec. 6,** 11:01 a.m., Moon at first quarter. **Saturday, Dec. 7,** 9:08 p.m., Algol at minimum. **Monday, Dec. 9,** 3:00 a.m., Moon farthest; 251,700 miles away. **Tuesday, Dec. 10,** 5:57 p.m., Algol at minimum; 7:33 p.m., Moon passes Jupiter. **Wednesday, Dec. 11,** 12:56 a.m., Moon passes Saturn. **Saturday, Dec. 14,** 2:38 p.m., Full moon. **Saturday, Dec. 21,** 6:55 p.m., Sun farthest south, winter commences; 8:45 p.m., Moon in last quarter. **Wednesday, Dec. 25,** 1:00 a.m., Moon nearest; 228,400 miles away; 2:03 a.m, Algol at minimum; 12:59 p.m., Moon passes Mars. **Thursday, Dec. 26,** 1:04 p.m., Moon passes Venus. **Friday, Dec. 27,** 10:52 p.m., Algol at minimum. **Saturday, Dec. 28,** 3:56 p.m., New moon. **Monday, Dec. 30,** 7:42 p.m., Algol at minimum. **Tuesday, Dec. 31,** 9:00 a.m., Jupiter changes from westward to eastward motion.

Eastern Standard Time throughout.

Science News Letter, November 30, 1940

South Africa, which may buy more *dyes* from the United States, prefers to import primary colors and to manufacture its own tints and shades.

Huge *"defrosters"* are being installed at Grand Coulee Dam to prevent ice from freezing tight the gates that control the Columbia River's flow over the dam.

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PHYSIOLOGY—PSYCHOLOGY

Babies Born in War Noise May Have Nervous Ills

Even Before Birth Infants May Suffer From Noise Or Terror of Mothers; Will Be Thin and Restless

BABIES born amid the crashes and bursting shells of war may run the risk of nervous ills even before they come into this world, Dr. L. W. Sontag, director of the Samuel S. Fels Research Institute, Antioch College, indicated to the Society for Research in Child Development meeting at Harvard Medical School as he described his experiments, on the unborn baby, of sounds, mothers' emotions, and other conditions.

A frightened mother who must give birth to her baby among the unusual noises of bombardment and anti-aircraft fire may find that the infant is affected by this unfortunate environment. If the disturbed conditions continue for a long period just before birth, the baby may actually suffer from a neurosis both before and after birth. He will be restless and overactive. He may have feeding difficulties and heart spasms. He will probably be thin.

Other conditions besides maternal terror and unusual noise which were described by Dr. Sontag as affecting the unborn are certain drugs, lack of vitamins in the mother's diet, maternal toxemia and abnormal functioning of the mother's thyroid gland. Mothers who take quinine for malaria before the birth of the baby may have a baby who is born with defective hearing. Lack of vitamins may produce rickets in the newborn baby, or in extreme cases even before birth.

Science News Letter, November 30, 1940

New-Born Differ in Age

NO INDIVIDUALS differ so much as new-born babies, Dr. Arnold Gesell, director of Yale University's Clinic of Child Development, told the meeting. Infants at birth may differ as much as 20 weeks in age, from extreme prematurity to late birth.

Although coming into the world may hasten certain motor, eye, and postural adjustments, it does not alter the tempo of development. The baby, Dr. Gesell explained, who is born eight weeks ahead of time will develop no faster than if he had not been born until the normal time. At 20 weeks of age he will be developed only to the level of the normal 12-weeks-old baby.

Science News Letter, November 30, 1940

Speech Sounds of New-Born

THE speech sounds made by babies less than ten days old were studied and reported to the meeting by Dr. Orvis C. Irwin, of the Iowa Child Welfare Research Station.

In the crying sounds of new-borns, Dr. Irwin found, 93% are what are known to phonetics students as "front vowels"—such sounds as are in "Wah-ah-ah!" A few consonants were also heard.

Science News Letter, November 30, 1940

Many Sorts of Ages

BIRTHDAYS are only one of many important ways of measuring the age of children, Dr. Willard C. Olson, of the University of Michigan, told the meeting of the Society for Research in Child Development.

With "mental age" the parents of school children are already familiar. It is also possible to measure height age, weight age, dental age, strength-of-grip age, reading age, and what is called "carpal age," the latter being based on changes, with development, in the bones of the hand and wrist. Dr. Olson also recommends what he terms an "organismic age," an average of all the different

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ages that may be available for the child.

Repeated measurement of all a child's ages will show the general tempo of his development and also the spurts and rhythms of his growth both in general and in special characteristics.

A "time slice," a sort of cross-section of a child's growth, may later be taken from these records for study or comparison with his level at a different period of development.

Much more accurate comparison of brothers and sisters of different ages is possible with this new method of study.

Science News Letter, November 30, 1940

ARCHAEOLOGY

Unnamed Hunters of 6000 B.C. New Characters in Prehistory

DISCOVERY of new characters in American prehistory, pioneers and big game hunters of the Oregon country about 6000 B. C., is stirring archaeologists. So new are these ancient Americans that science has not yet named them.

To Dr. L. S. Cressman, director of the University of Oregon's Museum of Natural History, who led the expedition unearthing these new clues to shadowy and ancient figures, the most significant thing about these peoples is the kind of weapons they used—stone dart points of unusual design.

Dr. Cressman, now in the East as a Guggenheim Fellow, has reported his finds before the American Philosophical Society and other scientific societies.

Evidence of the Oregon hunters' presence in early America has been dug from beneath old peat beds in a dried-up lake of southern Oregon, Dr. Cressman explained in an exclusive interview.

Thousands of years ago, wild horses, camels and elephants were trapped in swampy ground at the place and shot down by stone-tipped darts hurled from the hands of determined, and probably hungry, Oregon men.

Darts they used are remarkable because they are not like grooved stone blades which the now-famous Folsom Men of early America habitually used in their hunts.

While Folsom and Yuma hunters were seeking similar game east of the Rockies, these Oregon hunters shared the American wilderness with them, perhaps without either group knowing of the other. The weapons, which may seem a small clue, mean much, for in those days America's leading industries were making weapons and hunting wild beasts.

Bone tools hardened to fossil state and crudely made stone knives are among other belongings abandoned at the Oregon hunting ground.

Three successive chapters of early America can be read at this site, Dr. Cressman's excavations thus far reveal. A later wave of wanderers arrived when the low ground was beginning to fill with water, and these camped by the lakeside. Grinding stones and mortars and large stone projectile points for tipping weapons demonstrate their existence, about 2000 B. C.

Latest at the site were arrivals at about the dawn of the Christian era, America's immigration waves from Asia by that time had blossomed into the familiar Indian cultures. Pronounced just about the same as the well-known Klamath and Modoc Indians cultures of the Northwest, the artifacts of these latest lake settlers were found on abandoned beaches and islands of the recent lake.

Dr. Cressman has hope of fitting together these finds from the Oregon lake site with material from roughly similar horizons in Oregon caves, and tracing their relationship to early Southwestern cultures. He is searching museum collections of eastern cities for possible clues from other expeditions.

Science News Letter, November 30, 1940

AERONAUTICS

Windshield Wiper Now On Ships of Airlines

A WINDSHIELD wiper for airplanes, said to be the first that is practical, is now being installed on the ships of one of the large airlines. It operates by hydraulic pressure, on the same principle as a steam pump, weighs only 6½ pounds, and has provisions to feed alcohol as required to de-ice the windshield in winter flying. (*Acrotorque Co., Cleveland.*)

Science News Letter, November 30, 1940

- **ANATOMY**
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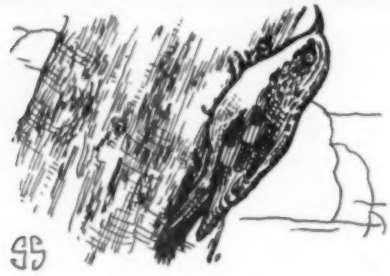
BIOLOGY

NATURE RAMBLINGS
by Frank Thone



Winter Patrol

WE ARE accustomed to thinking of winter as a time of terrible hardship for all kinds of animal life. The poor creatures of the outdoor world must die, or hibernate, or flee to warmer climates.

But there are compensations, at least for the insects and spiders that hibernate, lurking through the long cold in crevices, or under dead leaves, or beneath logs and stones. If they are chilled into seeming dead dormancy, so also are most of their enemies.

For the most murderous enemies of the lesser world that creeps are to be found in their own ranks. Almost all insects have reason to dread spiders, that spread their nets to snare them as they fly, or stalk them like leopards as they crawl.

Spiders in their turn have cause to fear those sleek hawks of the insect world, the wasps, that take them as well as caterpillars and many adult forms. And if mosquitoes and like-sized insects could tell you what dragonflies mean to them, they might well suggest that the name ought to be inverted to flying dragons.

Deadly, too, are those lesser wasps that manage to lay their eggs in or on caterpillars and other insect larvae, later to hatch and eat their unhappy hosts hollow from within. No less fatal are the plagues of fungi and bacteria that beset many species with sweeping epidemics.

All these harvesters of death work unceasingly as long as the weather is warm. But with the coming of the first frost these predators and parasites, being cold-blooded themselves, must die or go into winter quarters. Through the long cold a white truce stills the otherwise unending civil war in the entomological world.

One group alone that preys on insects needs have no heed for the truce of the frost. Birds, like mammals, are warm-blooded. They remain active throughout the winter, and with food always scarce the feathered species that eat insects redouble the closeness of their search.

Little detectives of the tree-trunks, like chickadees and brown creepers, go over unmeasured yards—perhaps miles—of bark fissures day after day. Their slender sharp beaks reach in like forceps to drag out and devour any lurking spider, any torpid insect, any pupating caterpillar, even any egg mass that they can find. These small feathered Davids slay their tens of thousands, mostly unheralded and unpraised, but greatly to the benefit of orchards and forests.

Science News Letter, November 30, 1940

MEDICINE

Radioactive Phosphorus Is Aid Against Chronic Lukemia

"QUITE encouraging" results in treating 16 patients suffering from chronic leukemia, malignant and fatal blood disease, with "cocktails" of radioactive phosphorus were announced by Dr. J. H. Laurence, Dr. L. A. Erf and Dr. L. W. Tuttle, of the University of California, at the Conference on Applied Nuclear Physics sponsored by the American Institute of Physics and the Massachusetts Institute of Technology.

Eleven of the 16 patients are still living. Of the five who died, three were dying at the beginning of the treatment. None of the 16 had previously had any other form of treatment and they were given the radio-phosphorus only during the past two years.

Advantages of the treatment are: 1. It is a simple method of giving irradiation treatment to certain structures—bone, blood and bone marrow—all over the body with a single cocktail or injection into the veins; 2. There are no reactions to the irradiation, such as sometimes follow X-ray treatments.

Altogether about 200 patients have been given this treatment. Some were suffering from leukemia and others had Hodgkins' disease, various forms of cancer, and a blood disease characterized by too many red blood cells.

Science News Letter, November 30, 1940

Neutron Ray for Cancer

HEALING of cancers by treatment with fast neutron rays from the cyclotron given to 47 cancer patients who were too far advanced to be helped by X-rays, radium or surgery was reported by Dr. Robert S. Stone and Dr. John C. Larkin, of the University of California.

The cancers themselves, both primary and those that had spread from the original one to other parts of the body, regressed. The primary cancers that ulcerated under the treatment "healed remarkably well," the California doctors reported. Whether or not the patients can be considered cured or whether the cancer will come back cannot be told yet, as it is only two years since the first patients in the group began treatment.

Better results are predicted when the method of giving the treatment can be improved.

Normal tissues are apparently not damaged irreparably by the doses of fast neutron rays necessary to produce regression of the tumors.

Science News Letter, November 30, 1940

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Additional Reviews On Page 352

EXPLORATION

ON SAFARI—Theodore J. Waldeck—*Viking Press,* 208 p., illus. by Kurt Wiese, $2.50. Explorers, it would seem, are born, not made—and then have to make themselves. At any rate, the author of this fascinating narrative had the fever for exploration in his blood, and not even the fever which laid him low at his first touch of Africa could drive it out. He survived, persevered through all kinds of blunders and luck, and in the end learned, and became able to tell of the veldt—as he does here, most fascinatingly.

Science News Letter, November 30, 1940

ETHNOLOGY

INDIANS OF YESTERDAY — Marion E. Gridley—*Donohue,* 63 p., illus., $1. An experienced teller of Indian tales, Miss Gridley here tells very simply the sort of facts that young people would enjoy reading about Indian life. The book has full page color pictures and smaller brown drawings on every page, by the well known Blackfoot Indian artist, Lone Wolf.

Science News Letter, November 30, 1940

PHOTOGRAPHY

DARKROOM HANDBOOK AND FORMULARY—Morris Germain—118 p., PHOTO TRICKS AND EFFECTS — Jacob Deschin — 126 p., INDOOR PHOTOGRAPHY—Hillary G. Bailey—94 p., MINIATURE CAMERA TECHNIQUE—Fenwick G. Small — 118 p., MANUAL OF ENLARGING—Stephen White —94 p., illus., 50c. each, *Ziff-Davis.* (Little Technical Library) Handy sized books packed with information for the camera enthusiast. They are well illustrated, printed and bound.

Science News Letter, November 30, 1940

GENERAL SCIENCE

THE LAYMAN SCIENTIST IN PHILADELPHIA — W. Stephen Thomas, Ed.—*Comm. on Education and Participation in Science, American Philosophical Society, 104 S. 5th St., Philadelphia, Pa.,* 44 p., illus., 10 c., 15 c. by mail. Obtainable direct only; not through Science Service. (See page 344)

Science News Letter, November 30, 1940

GENERAL SCIENCE

SCIENCE IN THE SERVICE OF MAN—*University of California Press,* 107 p., illus., $1.00. Within the covers of this booklet is contained a permanent record of the exhibits of the University of California at the Golden Gate International Exposition. Through the whole range of sciences, photographs and explanatory text tell just what was shown and the significance of each exhibit. This guide book will perpetuate the influence of this extensive exhibit even though the crowds no longer file through it.

Science News Letter, November 30, 1940

GENERAL SCIENCE

SCIENCE FOR THE ELEMENTARY-SCHOOL TEACHER—Gerald S. Craig—*Ginn,* 551 p., illus., $3. A book for teachers to study in order that they may teach elementary science more effectively. First, Prof. Craig of Horace Mann School and Teachers College, Columbia University, discusses the teacher, the child and the place of science in education. He then provides content in three parts: the earth and the universe, the life of the earth and the energy of the universe. Finally there are listed suggestions as to what and when should be taught in the lower primary, primary and intermediate grades.

Science News Letter, November 30, 1940

ZOOLOGY

THE INDO-CHINESE FOREST OX OR KOUPREY — Harold Jefferson Coolidge, Jr.—*Museum of Comparative Zoology, Harvard College, Cambridge, Mass.,* 531 p., 11 pl., $6. See *SNL,* Nov. 9.

Science News Letter, November 30, 1940

AERONAUTICS

AEROPLANE INSTRUMENTS (PART I)—E. Molloy and E. W. Knott, eds.—*Chemical Pub. Co.,* 132 p., illus., $2. This book deals with the operation and maintenance of the Sperry gyropilot, Sperry, and Smith aircraft instruments. It is stated that a later volume will deal with further examples of instruments and automatic control equipment.

LANDING LEGS, WHEELS, AND BRAKES —E. Molloy and E. W. Knott, eds., *Chemical Pub. Co.,* 132 p., illus., $2. "Happy landings" of airplanes depend largely on the quality of the landing gear. This book discusses technical features of several makes, with particular reference to British practice.

CARBURETTORS (Part I)—E. Molloy and E. W. Knott, eds.—*Chemical Pub. Co.,* 124 p., illus., $2. A technical discussion of the features of airplane carburetors, prepared in England, as indicated by the spelling of the title word.

Science News Letter, November 30, 1940

CHEMISTRY

CATALYSIS, Inorganic and Organic—Sophia Berkman, Jacque C. Morrell and Gustav Egloff—*Reinhold,* 1130 p., illus., $18. Catalysts, the chemical "parsons" which, without being altered themselves, make other chemical changes possible, play an extremely important rôle in chemical industry. This authoritative work covers all phases, particularly their use in the petroleum industry, to which a chapter is devoted.

Science News Letter, November 30, 1940

ELECTRICAL ENGINEERING—CHEMISTRY

THINGS A BOY CAN DO WITH ELECTROCHEMISTRY—Alfred Morgan—*Appleton-Century,* 198 p., illus., $2. Electrochemistry is important in many industrial processes: preparation of aluminum, for example. This book will introduce an experimentally inclined boy to its wonders, with things he can do involving simple apparatus and no danger.

Science News Letter, November 30, 1940

MATHEMATICS—ENGINEERING

TWO-ARC CURVES (2d ed.)—*Deeble Printing Co., Salina, Kansas,* illus., 35c. Instructions for drawing close approximations of the ellipse with circular arcs.

Science News Letter, November 30, 1940

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Additional Reviews On Page 351

BOTANY

SPICE ON THE WIND — Irmengarde Eberle—*Holiday House,* 56 p., illus. by Richard Jones, $2. Cloves from Zanzibar, nutmeg from Amboina, spices from many lands told about briefly and simply, in a way that will interest readers of all ages. In addition to the colored sketches, there is an illustration in a new "dimension": the pages of the book are steeped in a spicy scent.

Science News Letter, November 30, 1940

BIBLIOGRAPHY

AERONAUTICS TRAINING FOR NATIONAL DEFENSE — Paul Howard — *Amer. Library Assn.,* 8 p., 25c.

ENGINEERING DEFENSE TRAINING, A Booklet—Harrison W. Craver and Harrison A. Von Urff—*Amer. Library Assn.,* 13 p., 25c.

Science News Letter, November 30, 1940

ENGINEERING

RURAL AMERICA LIGHTS UP—Harry Slattery—*National Home Library Foundation* 142 p., 25c. The story of how electricity is being taken to the farms of America, written by the Administrator of the Rural Electrification Administration and head of the rural program that now serves over a million American farms. In the past five years more American farms have been electrified than during the previous 50 years.

Science News Letter, November 30, 1940

AERONAUTICS

YOUNG AMERICA'S AVIATION ANNUAL 1940-1941 — Frederick P. Graham and Reginald M. Cleveland, eds.—*McBride,* 262 p., illus., $2. Despite the title, it is probable that America of all ages will enjoy this profusely illustrated book telling all about aviation.

Science News Letter, November 30, 1940

CHEMISTRY

FUNDAMENTAL CHEMISTRY—Horace G. Deming—*Wiley,* 764 p., illus., $3.50. This college text, the author states, endeavors "to present chemistry as a manner of thinking, rather than as a collection of facts, however systematized, or as an array of unsupported assumptions, to be taken on faith. . . . It introduces no important theory until the student has begun to feel the need for it."

Science News Letter, November 30, 1940

METALLURGY—HISTORY

THE SONS OF VULCAN—Thomas Hibben—*Lippincott,* 259 p., illus., $2. This interesting account of the history of metal working starts with prehistoric man and his tools, and shows the development of modern metallurgy.

Science News Letter, November 30, 1940

INVENTION—CHEMISTRY

HANDBOOK FOR CHEMICAL PATENTS—Edward Thomas—*Chemical Pub. Co.,* 270 p., $4. This is intended both as a handbook for the general reader interested in the subject, and also as a supplement to the author's more complete book, published in 1937, which it brings up to date with the citation of later cases.

Science News Letter, November 30, 1940

ETHNOLOGY—FICTION

HAWK OVER WHIRLPOOLS — Ruth M. Underhill—*Augustin,* 255 p., $2.50. A readable story of Indian characters fighting against intrusion of the white man's strange ways, in the Southwest. The author, well known for her writings on Indians of this region, says that the tale represents the now historic era of 25 or more years ago, before today's program of Indian self-government and humanized education.

Science News Letter, November 30, 1940

ETHNOLOGY—FICTION

YAMINO-KWITI, Boy Runner of Siba—Donna Preble—*Caxton,* 236 p., illus. by author, $2.50. An historical novel, based on Indian life in California at the time of arrival of white men. It is intended, apparently, for readers of the teen ages. The hero is an Indian boy with ambition to become message bearer for his tribe, and his adventures abound in ethnological details.

Science News Letter, November 30, 1940

PHYSICS

APPLIED X-RAYS (3rd ed.)—George L. Clark—*McGraw-Hill,* 674 p., illus., $6. Though medical uses of X-rays are the only ones with which most people come into contact, they have many other scientific and industrial applications, covered in this book. New developments, made since the previous edition in 1932, are described.

Science News Letter, November 30, 1940

CHEMISTRY—BIOGRAPHY

THE LIFE OF IRA REMSEN—Frederick H. Getman—*Journal of Chemical Education,* 172 p., De Luxe Edition, $3.50; Regular Edition, $2.50. An interesting and sympathetic account of the career of one of the greatest figures in American chemistry.

Science News Letter, November 30, 1940

NUTRITION

VITAMINS, What They Are and How They Can Benefit You—Henry Borsook—*Viking Press,* 193 p., $2. This "Cook's tour of the vitamins," by the professor of biochemistry at California Institute of Technology, is simple, practical and easy to read. The sample menus for home or restaurant ordering of food on different-sized budgets are particularly useful, as are the tables which give vitamin values in household measures of foods, such as one-fourth of a head of cauliflower or one-half a cup of cooked peas.

Science News Letter, November 30, 1940

BIOGRAPHY—HISTORY

FROM PANAMA TO VERDUN—Philippe Bunau-Varilla—*Dorrance,* 277 p., illus., $2.50. The autobiography of the man who started the Panama Canal for the French, and who induced the United States to finish it. He also planned the cross-Channel tunnel, solved the Dreyfus case, lost a leg at Verdun and died at the age of 82 in Paris just before the Nazis entered this year.

Science News Letter, November 30, 1940

GENERAL SCIENCE

EAST IS EAST AND WEST IS WEST—Carlos Emmons Cummings — *Buffalo Museum of Science,* 382 p., illus., $3.50. An analysis of the exhibition methods of the two great world's fairs of 1939, conducted under Rockefeller Foundation auspices by the Buffalo Museum's director and a group of museum specialists from other museums. The report takes the form of a beautifully-printed book, which is pleasingly readable and which should have great influence on exhibits of the future.

Science News Letter, November 30, 1940

PHILOSOPHY—GENERAL SCIENCE

A PHILOSOPHY OF SCIENCE—W. H. Werkmeister—*Harper,* 551 p., $4. A history of science and scientific method from a philosophical viewpoint done into a college text by the University of Nebraska's associate professor of philosophy. The contention throughout the book is that all knowledge is grounded in first person experience.

Science News Letter, November 30, 1940

TECHNOLOGY

SCIENCE IN INDUSTRY—A. M. Low—*Oxford Univ. Press,* 160 p., illus., $1.75. A British professor discusses the industrial revolutions caused by science.

Science News Letter, November 30, 1940